HyperRapid NX
The Benchmark for Industrial 24/7 Micromachining Applications

The HyperRapid NX high power industrial picosecond laser features a compact and modular design with a single customer interface for all power levels and wavelengths.

The outstanding wide window of operation enables optimum process performance under all circumstances: High average power levels deliver high throughput and minimize cost-per-part while flexibility in repetition rate and pulse energy results in excellent quality.

The HyperRapid NX product support strategy includes options to match the most demanding uptime and cost-of-ownership requirements.

FEATURES & BENEFITS

- Single wavelength output: 1064 nm, 532 nm, or 355 nm
- Unique combination of power and operational flexibility to reduce cost-per-part for micromachining applications
- SmartPulse™ for total pulse control to the user
- Many product support options to optimize uptime and cost-of-ownership
- Compact and light weight with common interfacing for all models for easy integration

APPLICATIONS

- Cutting and drilling of glass, sapphire, ceramics and other brittle materials and composites
- Cutting, drilling, selective removal of complex composite structures from dissimilar materials, including oxides, plastics, and organics
- Micromachining and structuring of large surfaces with line focusing or multiple beams
## HyperRapid NX Datasheet

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Single Wavelength Output (nm)</th>
<th>1064</th>
<th>532</th>
<th>355</th>
<th>1064</th>
<th>532</th>
<th>355</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplifier Pulse Repetition Rate (kHz)</td>
<td>200 to 1000</td>
<td></td>
<td></td>
<td>400 to 1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Pulse Repetition Rate Range (kHz)</td>
<td></td>
<td></td>
<td>0 to 1000</td>
<td></td>
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</tr>
<tr>
<td>Pulse Duration (ps)</td>
<td></td>
<td></td>
<td>&lt;15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Power (W)</td>
<td>50&lt;sup&gt;6&lt;/sup&gt;</td>
<td>25</td>
<td>15</td>
<td>100</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Average Power stability (RMS 1σ, %)</td>
<td></td>
<td></td>
<td>≤1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pulse Energy (µJ)</td>
<td>220</td>
<td>125</td>
<td>75</td>
<td>250</td>
<td>125</td>
<td>75</td>
</tr>
<tr>
<td>Pulse-to-Pulse Energy Stability (RMS 1s, %) ≤</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Beam Quality Parameter (M²)</td>
<td></td>
<td></td>
<td>≤1.3</td>
<td></td>
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<tr>
<td>Beam Diameter, 1 m in front of laser (mm)</td>
<td>5.0 ± 0.5</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Beam Divergence, full angle (mrad)</td>
<td></td>
<td></td>
<td>≤1</td>
<td></td>
<td></td>
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<tr>
<td>Beam Circularity, 1 m in front of laser (%)</td>
<td></td>
<td></td>
<td>≥85</td>
<td></td>
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<tr>
<td>Beam-Pointing Stability (µrad/°C)</td>
<td></td>
<td></td>
<td>≤50 (peak-to-peak)</td>
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<tr>
<td>Bore Sight Accuracy (beam to specified exit location)</td>
<td></td>
<td></td>
<td>≤1 mm</td>
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<tr>
<td>Lateral Angular</td>
<td></td>
<td></td>
<td>≤5 mrad</td>
<td></td>
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<tr>
<td>Direction of Polarization (Vertical/Horizontal)</td>
<td>V</td>
<td>H</td>
<td>H</td>
<td>V</td>
<td>H</td>
<td>H</td>
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<tr>
<td>Polarization Ratio</td>
<td></td>
<td></td>
<td>&gt;100:1</td>
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<tr>
<td>Warm-up Time from Chiller Start (min)</td>
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<td></td>
<td>&lt;45</td>
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<tr>
<td>Electrical Supply</td>
<td>100 to 230V AC/50 to 60 Hz/2.5 kW</td>
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<td>Mounting Orientation</td>
<td>Horizontal</td>
<td></td>
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<tr>
<td>Chiller</td>
<td>Water-to-Air or Water-to-Water</td>
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<td></td>
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<tr>
<td>Dimensions</td>
<td></td>
<td></td>
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<tr>
<td>Laser Head</td>
<td>600 x 780 x 245 mm</td>
<td></td>
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<tr>
<td>Power Supply</td>
<td>3U 19” rack</td>
<td></td>
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<tr>
<td>SMC Chiller</td>
<td>500 x 317 x 615 mm</td>
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<tr>
<td>Weight</td>
<td></td>
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<tr>
<td>Laser Head</td>
<td>≤67 kg</td>
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<tr>
<td>Power Supply</td>
<td>16 kg</td>
<td></td>
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<tr>
<td>SMC Chiller</td>
<td>43 kg</td>
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</tbody>
</table>

### BURST MODE OPERATION

<table>
<thead>
<tr>
<th>Burst Mode Operation Range (kHz)</th>
<th>100 to 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Energy in the Burst&lt;sup&gt;8&lt;/sup&gt; (µJ)</td>
<td>≥ 500</td>
</tr>
<tr>
<td>Maximum Number of Burst&lt;sup&gt;9&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

### OPERATING SPECIFICATIONS

- **Allowed Temperature Range During Operation**: +15°C to +30°C (free of condensation)
- **Humidity (%)**: 0 to 90 RH, non-condensing, Dew-point <22°C

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1. At lowest amplifier pulse repetition rate, unless stated otherwise.
2. Maximum output power (variable attenuator and process shutter at maximum transmission).
3. After warm-up time, chiller temperature = 23 ±0.1°C.
4. Steady-state (no pulse gating or change of pulse repetition rate).
5. Single-pulse operation (burst number = 1).
6. At 500 kHz.
7. Over 8 hours, ±1°C ambient temperature.
8. With 5 pulses in the burst, at the lowest burst mode operation range frequency.
9. (Pulse repetition rate)x (number of burst) cannot exceed 5 MHz.
HyperRapid NX Datasheet

TYPICAL PERFORMANCE CHARTS

Typical Power Output

Typical Single Pulse Energy Output

TYPICAL MANUFACTURING DATA FOR HyperRapid NX 355-30 (30 W UV)

HyperRapid NX is able to deliver cutting-edge performance in volume. Manufacturing data shows the excellent performance and reliable consistency across a large number of laser systems.

SmartPulse™: Placing You in the Driver’s Seat

HyperRapid NX architecture gives you full control on the pulse train delivered to the workpiece. You are able to fine tune your process to the greatest detail or address different applications with the same laser.
MECHANICAL SPECIFICATIONS

HyperRapid NX

Bottom View

Beam Output

360 mm (11.81 in.)

25 mm (0.98 in.)

300 mm (11.81 in.)

350 mm (13.78 in.)

254 mm (10.0 in.)

365 mm (14.37 in.)

675 mm (26.57 in.)

750 mm (29.53 in.)

711.2 mm (28.0 in.)

Required Space for Service

434 mm (17.09 in.)

600 mm (23.62 in.)

Emission LED

218.5 mm (8.6 in.)

244.5 mm (9.67 in.)

845 mm (33.27 in.)

94 mm (3.70 in.)

780.5 mm (30.73 in.)

48 mm (1.89 in.)

53 mm (2.09 in.)

18 mm (0.71 in.)

Required Space for Cable and Tubes

711.2 mm (28.0 in.)

25 mm (0.98 in.)

300 mm (11.81 in.)

350 mm (13.78 in.)

254 mm (10.0 in.)

365 mm (14.37 in.)

675 mm (26.57 in.)

750 mm (29.53 in.)

711.2 mm (28.0 in.)

25 mm (0.98 in.)

300 mm (11.81 in.)

350 mm (13.78 in.)

254 mm (10.0 in.)

365 mm (14.37 in.)

675 mm (26.57 in.)

750 mm (29.53 in.)

Coherent, Inc.,
5100 Patrick Henry Drive Santa Clara, CA 95054
p. (800) 527-3786 | (408) 764-4983
f. (408) 764-4646

tech.sales@coherent.com www.coherent.com

Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice.
Coherent offers a limited warranty for all HyperRapid NX Lasers. For full details of this warranty coverage, please refer to the Service section at www.Coherent.com or contact your local Sales or Service Representative.
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